Specifying the Trade and Financial Channels of External Adjustment in Emerging and Frontier Market Economies

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Abstract

Less advanced economies have long been considered as less prone to external shocks in the international economics literature. However, increasing financialization and trade interlinkages—especially in Sub-Saharan Africa (SSA)—are creating country-specific exposures to external shocks. These spill overs have evolved over time in their relevance and how they impact these economies, including their external financial position. It remains to be seen how effective national macroeconomic policies towards these shocks fair. This paper identifies contemporary vulnerabilities and associated policy implications for emerging and frontier economies in Africa. Specifically, the paper emphasizes the heterogeneity of these countries by their trade composition (e.g resource intensity) and financial profile (e.g composition of financial flows) to study how external shocks are transmitted through trade and financial channels. Given the compelling evidence in the literature that there is "no one size fits all" policy response for small open economies, this study speaks to the growing institutional capacity and relevance of central banking in Africa, and contributes to an emergent literature on the trade and financial channels of external adjustment.

Keywords: International spillovers, Trade channel, Financial channel, Emerging and frontier economies, Monetary authority, Vulnerability

JEL: E32, E41, E42, E52, E58

1. Introduction

Developing economies in this study are classified into emerging and frontier. From the World Bank classification by income, emerging economies rank higher as upper middle income relative to emerging economies that rank as lower middle income economies. Emerging economies are more close to advanced economies in per capita income, financial market development, lower default risk, and credibility of policies such as inflation targeting. Both emerging and frontier economies have good growth prospects, high rates of return, high level of risk, extreme volatility, and institutional and policy transition (Mody, 2004).

Over the recent past, there has been increasing financial integration, improvement in terms of trade and macro-economy policy adjustments that are among the contributing factors to improved macroeconomic outcomes in emerging and frontier economies. While the favourably macroeconomic outcomes signal the strengthening of economies, increasing financialization and trade inter-linkages-including African economies-are creating country-specific exposures to external shocks. Exposure of these economies to vulnerabilities has not been decisively addressed to shield them from domestic and external shocks in the near and long term.

Transmission mechanisms of external shocks to emerging and frontier economies are getting attention as these economies grow in their potential and in aggregate the risk they pose to the global economy. One mechanism through which a crisis in one country can be transmitted to another is via the trade channel. International economics literature has a growing interest in contagion as crisis in one country affects the relative price and volume of trade partners exports. Theoretical models show that these trade linkages have spillover effects (Forbes, 2002).

Another mechanism is the financial channel as financial linkage permeates financial spillovers across financial markets (Kose et al., 2003) . [1] In less developed economies, especially in Sub-Saharan Africa, Gries et al. (2009) reports a marginal impact of financial deepening and trade openness on economic development. There is a high likelihood this relation, as reported for less developed economies such as those in SSA,

[1] These spillovers, through either trade or financial linkages or both simultaneously, promotes synchronisation of business cycles

has changed because interest rate differentials and relaxation of capital controls contribute to a rise in financial flows integration in emerging as well as frontier economies (Ahmed and Zlate (2014) , Gourinchas and Rey (2014) and Dahlhaus et al. (2018)).

The rising exposure to external shocks underscores the importance of examining frontier and emerging economies. As noted by Christensen and Upper (2017), the Global Financial Crisis (GFC) exposed that most of these economies are increasingly becoming vulnerable. Further, Easterly and Kraay (2000) and Vegh et al. (2018) reports that low income countries (LIC) have been experiencing growth volatility stemming from the terms of trade volatility but these studies have not analysed deeper the response of economies and macro policies when other key factors like resource intensity and the level of financial integration are taken into account. For advanced economies, faster growth is promoted by their resilience and hence shrink less and less often when they are hit by external shocks. Therefore, understanding transmission mechanisms of external shocks, their impact and the response of macro policies in less developed economies is critical to building resilient economies.

However, existing studies focus on either one channel or both but fail to distinctively take into account how heterogeneity of economies in their resource intensity and financial profile affect country-specific vulnerabilities stemming from trade and financial linkages. This study contributes to the literature by specifying and analysing contemporary vulnerabilities, especially those emanating from trade and financial interlinkages, and the policy implications in emerging and frontier economies. Unlike other studies, this study will specifically emphasize the heterogeneity of these countries by their trade composition (e.g resource intensity) and financial profile (e.g composition of financial flows) to study how external shocks are transmitted through trade and financial channels. Moreover, to identify these channels, this study contributes methodologically by using a factor-augmented vector auto-regression (FAVAR) approach in addition to the standard dynamic panel vector auto-regression (PVAR) to account for relevant variables previously omitted in small open economy (SOE) framework.

After profiling sample countries by way of resource intensity and financial integration, this study has analysed financial and trade shocks for South Africa, Nigeria, Ghana and Kenya with the first two economies representing resource intensive and fi-

nancially integrated economies. Monetary authority's response to trade and financial shocks through the use of policy instruments can stabilize or destabilize the economy while at the same time a positive or negative reaction can arise through the exchange rate, trade and capital movement. This is evident from the response of each category of economies to the trade and financial shocks.

Besides identifying and showing the importance of prominent shocks, varied responses of selected variables to the external shocks across the profiled economies confirms that "one size fits all" principle cannot apply. The uniqueness of each economy underscores the need for country-specific policy approach and specifically in central banking.

The next section is a review of literature followed by data and methodology in the third section. Section 4 presents estimation procedure, empirical findings and discussion in section 5, and finally the conclusion is presented in section 6.

2. Literature review

2.1. Snapshot of emerging and developing market economies

Emerging and developing economies, though a heterogeneous group, are characterized by a higher degree of economic vulnerability than advanced economies, and, more recently, more susceptible to external shocks. On one hand, contemporary international macroeconomics identifies emerging and developing economies as small open commodity-dependent economies. These economies typically lack diversification and are limited in their ability to exploit economies of scale as they experience, for example, a natural resource curse.[2] As a result, they have high volumes of import dependence. However, these economies vary in their characteristics such as natural resource endowment, trade openness, financial integration, and macroeconomic policies. When external financial and trade shocks are experienced, the outcome may be beneficial or adverseBriguglio et al. (2006).

Emerging economies distinct from developing economies in that emerging economies have accelerated growth with characteristics nearing those of advanced economies and

[2]Well-endowed economies tend to exhibit over-valued real exchange rates. This dampens the competitiveness of exportable goods from the broader economy, which hinders diversification.

are largely financed by unreliable foreign direct investments. Reliance on financing by and effects of capital flows is experienced in many emerging market economies Ghosh et al. (2017). Before 2008, the Fragile 5 -Brazil, Indonesia, India, South Africa and Turkey- experienced economic boom but as advanced economies contracted after the GFC, slow growth and currency weakening is experienced especially between 2011 and 2014.

As capital flows continue to rise, especially foreign direct investment and equity assets, external vulnerability increases. Similarly, there are risks that trade channel pose to emerging and frontier economies as trade openness grows. Thus, mitigative policies are paramount to alleviate adverse effects associated with trade and financial integration Dahlhaus et al. (2018).

2.2. Trade and financial channel

Previous studies delves in commodity price channel and the borrowing capacity of an economy, and also on the impact of commodity prices on emerging markets business cycles (Garcia-Cicco et al. (2010) and Drechsel and Tenreyro (2018)). A negative co-movement of interest rate spread and commodity prices is also reported by existing studies. The interaction between trade and financial channel can also be expressed through current account adjustment (as a current account deficit makes a country vulnerable) and the flow of foreign investment (a country can finance current account deficit either through external financing, decreasing foreign assets or currency depreciation).

Riad et al. (2012) elaborates that a high correlation exists between trade and financial interconnectedness through which countries transmit disturbances via trade or financial channel, or via both channels simultaneously. That is, trade channel through export prices and volume, and financial channel through capital flows.

New dynamics in trade are expected as emerging economies, like China and India, are shifting the importance of global trade away from advanced economies like the US, UK, and Japan, not forgetting the increasing investment by China in less developed economies such as those in SSA (Zafar, 2007). This has significant implications as demand also shifts in the course of new trade and financial pattern formations.

The 1970s saw increasingly integrated trade relations around the globe.[3] This trend in trade liberalization and globalization preceded the even greater liberation of global capital flows (Gourinchas and Rey, 2014). Although trade relations keep improving, African economies reap marginal benefits as they experience challenges relating to the evolving terms of participation in international trade and global value chains (GVCs). Many SSA economies, for instance, are commodity exporters and therefore participate only in the early stages of GVCs.[4]

Some of the resource-intensive SSA countries mainly in oil and metal exports are still recovering from the sharp decline in metals and oil prices after mid-2014 (Christensen and Upper, 2017). Notably, a rise in levels of trade protectionism by some countries also impacts African economies besides the conventional trade channel by causing significant realignments in major exchange rates. Central banks are put under pressure as exchange rate policies are affected. Some countries, especially after the GFC, allowed for a floating regime with no intervention while others have pegged their currencies. Fears of sharp exchange rate swings deterring capital flows, inflationary pressures, and a rise in external debt burden have pushed some monetary authorities not to allow for currency depreciation. While appreciation of domestic currency sounds good it impacts on the demand for exports negatively since they become relatively expensive hence less attractive.

Trade channel also affects output levels in the domestic economy through expansionary or contractionary effects. A rise in output level following a depreciation is an expanisonary effect but for developing economies that are afflicted by currency crises depreciation is associated to a recession (Frankel, 2010). However, the effect on exports and imports may not be complete if there is a disproportionate change in either exports or imports due to change in foreign exchange rate. Elasticity of exports and imports to a change in exchange rate varies across countries. Such variations may be due to the degree of market share of foreign firms in the domestic market, and the share of domestic and foreign firms in markets abroad.

[3]Trade agreements and value chain integration has unbundled production, increased cross-border flow of services, investments, goods, and know-how.

[4]IMF 2017: "A Rebalancing Act for China and Africa; The Effects of China's Rebalancing on Sub-Saharan Africa's Trade and Growth" reports South Africa, Kenya, Ethiopia, Tanzania, and Seychelles as examples that have become more integrated in agro-business and agriculture.

The composition of trade flows also affect reponsiveness of imports and exports to exchange rate movements. Commodity exporters in SSA, for instance, are reported by Christensen and Upper (2017) as having their growth plunge after the prices of metals and oil dropped around mid-2014 while a different study by Burstein and Gopinath (2014) reports prices of specialised goods as being less sensitive because they have variable mark ups.

Country characteristics also play an important role to the price elasticity of exports. For instance, due to macroeconomic factors price elasticity of exports is lower in advanced economies but high in emerging economies (Bussière et al., 2014). For exporting firms that are also importers, aggregate exchange rate pass-through is low (Amiti et al., 2014). This is unlike for highly productive firms that can vary their mark up as exchange rate moves since they are not price takers Berman et al. (2012).

Moreover, structural and cyclical reasons such as a change of the composition of a country's imports can affect the extent of exchange rate pass-through (Campa and Goldberg, 2005), and increased trade integration (Gust et al., 2010), especially due to the role played by global value chains (Ahmed et al., 2015), and how trade balances are influenced by global value chains (Kharroubi, 2011).

2.3. Central Bank intervention and the trade-financial trade off

Economies can receive different effects from a given change in its exchange rate. To some economies an appreciation may lead to an economic expansion, but to others a contraction. Whether an economy would expand or contract depends on the intensity and predominance of its channels external adjustment: that is, the trade channel versus the financial channel. These channels-trade and financial-works in the opposite direction. For instance, currency depreciation can on one hand tighten domestic financial position due to valuation effects especially when a country has foreign currency denominated debt, but at the same time, increase trade by making exports relatively more attractive.

In the above example, valuation effects due to exchange rate fluctuations transmit financial shocks into an economy with foreign currency denominated debt. Whereas, the response is passed on in the opposite direction through the trade channel. However, unlike countries with a floating exchange rate regime, the external competitiveness of

countries with fixed exchange rates experience large swings. When monetary authorities persue inflation targeting, in contrast, they face a trade-off between economic activity and exchange rate stabilization. On one hand, according to Kearns and Patel (2016), raising interest rates lowers inflation and appreciates domestic currency but reduces aggregate demand, while on the other hand lowering of interest rates need not support output but has a valuation effect that depress demand when domestic financial position get tight if a country's large share of debt is denominated in foreign currency.

Whether a change in exchange rate is due to a monetary policy change or trade channel, the implication is that valuation changes affect the external financial position. For instance, currency depreciation decreases net worth of a borrower with foreign currency debt hence tightening of domestic lending (Bekaert et al., 2013). By mopping excess liquidity, a contractionary policy appreciates local currency thus increase in the financing cost prompting banks to tighten lending. Funding costs reduce following an expansionary policy. Kearns and Patel (2016) further argues that domestic financial condition eases when local currency appreciates and borrowers have foreign currency debt. Ease of financial condition emanating from local currency appreciation stimulates domestic economic activities. To the contrary, depreciation weakens the domestic balance sheet leading to tightened financial conditions.

2.4. Drivers of foreign flows and domestic impact

In addition, tightening or loosening of domestic financial conditions can be affected by commodity prices, withdraw of deposits, and risk premium (Hofmann et al., 2016). Price booms expands the borrowing capacity by increasing the external debt cover that lowers the risk premium.

Also, monetary policy, just like trade channel impacts the cost and size of borrowing and lending by driving exchange rate fluctuations. For instance, Bruno and Shin (2015), reports an increased cross-border borrowing when the US dollar depreciates following expansionary monetary policy in the US. This is due to a decrease in the cost of borrowing and consequently lenders increase the supply of funds. If the local currency depreciates financial contraction is experienced. Advanced economies as well receive US monetary shocks Rey (2015).

Moreover, interest rate differentials between emerging and developed economies have a significant effect on private capital inflows to EMEs and especially portfolio inflows due to their greater sensitivity to interest rates differential (Ahmed and Zlate, 2014). This trend is also reported by Gourinchas and Rey (2014) and Nier et al. (2014), as investors look for higher yields .

Accroding to Ghosh et al. (2017), relaxation of capital controls has seen EMFEs attract capital flows and this also generates the need to re-looking into macroeconomic implications these flows. When speculative investors seeking high nominal interest rates relocate investment, they can cause a crash due to rapid and massive capital outflow. In order to mitigate the latter, Edwards (2009) notes that some countries mostly the developing economies enact capital controls.[5]. Empirical studies report short-run capital inflows and outflows as potential sources of macro instability but long-term financing of foreign direct investment (FDI) is likely to stabilize an economy Lipsey et al. (1999).

3. Data and methodology

The dataset covers a period from 1970-2015 for the sample of economies. The selection criteria is based on the degree of economic vulnerability stemming from trade and financial integration. IMF's International Financial Statistic database, World Bank, UNTCAD, Bank for International Settlement, World Integrated Trade Solutions (WITS), and the respective country's reporting agencies are the main sources of data employed. In addition, Part of this dataset is borrowed from the work by Lane and Milesi-Ferretti (2018).

In order to have unbiased and better representation of EMFEs by economic vulnerabilities, these economies are plotted alongside advanced economies (see appendices for economies plotted in Figure 1, Figure 3 and Figure 2).

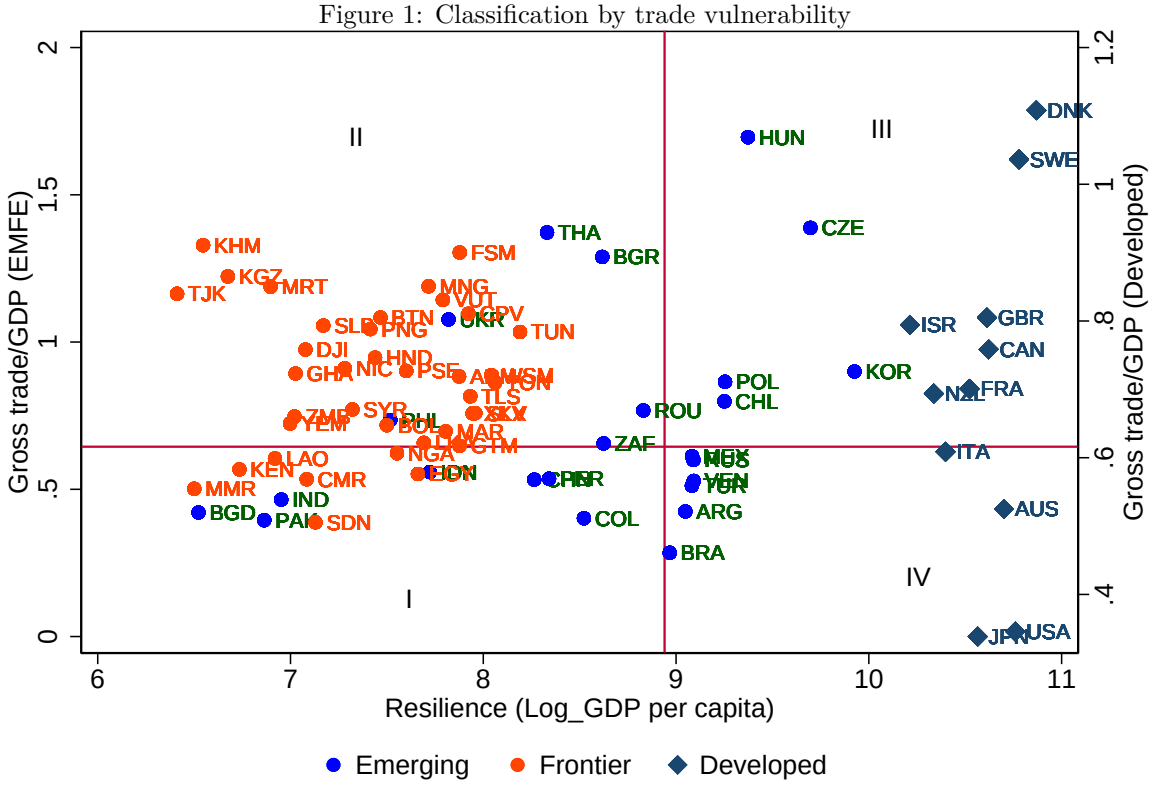
Figure 1 shows economic vulnerability due to trade openness is high and especially for EMFEs. Gross trade is taken as a good measure of economic vulnerability as it affects current account adjustment (as a current account deficit makes a country

[5]In the 1990s, Chile deployed penalties on short-term capital inflows and succeeded in shifting the maturity inflows toward the longer-term

vulnerable) and the flow of foreign investment (a country can finance current account deficit either through external financing, decreasing foreign assets or currency depreciation). GDP per capita is used as a proxy for economic resilience because when an economy attains a relatively good economic resilience through policy-induced ability to withstand or recover from adverse exogenous shocks it can translate into better GDP per capita.

Economies in quadrant I have low resilience and low vulnerability, quadrant II have high vulnerability and low resilience, quadrant III have high vulnerability and high resilience, and quadrant IV comprise of economies with low vulnerability and high resilience.

Figure 1: Classification by trade vulnerability

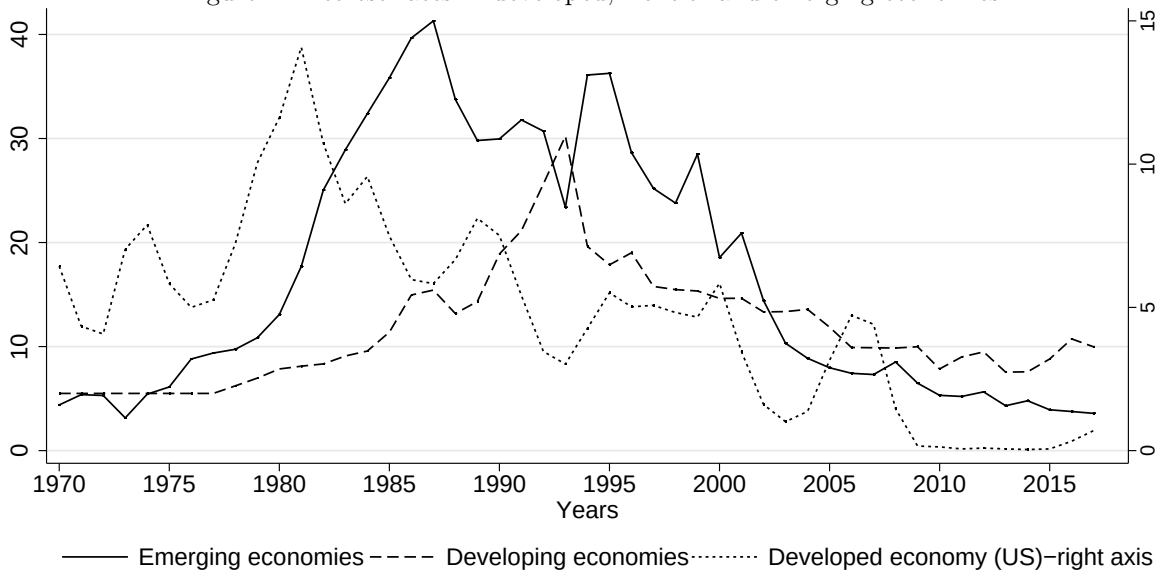


Source: Author. Data sources are IMF's IFS, World Development Indicator and Lane and Milesi-Ferretti (2018). Log GDP per capita is used as a measure for economic resilience. Note: emerging market and frontier economies (EMFE) scaled on left axis and developed economies on right axis.

In addition to the risk of trade openness, vulnerability precipitated by capital flows is likely to rise in emerging and frontier economies as "global imbalances" (capital flow to the word's dominant capital market-United States) shift. High interest rates in EMFE relative to advanced economies will attract more inflows from advanced

economies. Figure 2 shows differential in interest rates across emerging, developing, and developed economies that will increase "downstream" flow of capital from advanced to emerging and developing economies.

Figure 2: Interest rates in developed, frontier and emerging economies



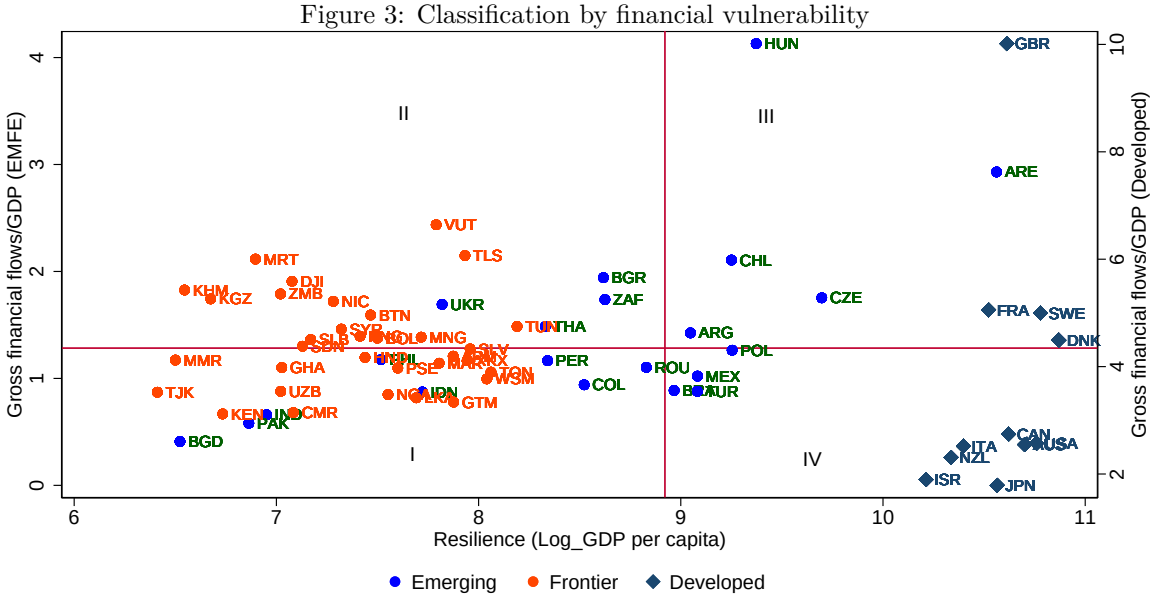
Source: Author. Data from International Financial Statistics (IFS). Note: emerging market and frontier economies (EMFE) scaled on left axis and developed economies on right axis.

Gourinchas and Rey (2014) and Nier et al. (2014) identify interest rates as one of the determinants of portfolio flows as investors look for higher yields. This emphasises the growing importance of empirical evidence of valuation effects especially for a subset of economies (emerging and frontier) that previous literature considered as less vulnerable to external shocks. As the external balance sheet of EMFE grow, the importance of external adjustment due to valuation changes sets in as earlier discussed by Lane and Milesi-Ferretti (2007) and Lane and Milesi-Ferretti (2018).

When vulnerability of emerging and developing economies to external financial shocks stemming from increased capital flows is plotted against economic resilience, very few emerging economies, as seen in Figure 3. Advanced economies are more resilient to financial risks while less developed ones are more vulnerable and less resilient.

Plotting vulnerability against economic resilience present EMFEs as a unique sample with majority of economies lying in quadrant II. That is, vulnerable economies with low resilience.

Figure 3: Classification by financial vulnerability



Source: Author. Data sources are IMF's IFS, World Development Indicator and LM-Ferretti(2017). GDP per capita is used as a measure for resilience of economies. Note: emerging market and frontier economies (EMFE) scaled on left axis and developed economies on right axis.

3.1. Sample selection

A sample of EMFEs is selected from quadrant II. First, an average for gross external financial flows for each country and for the whole sample in quadrant II. Then an average for oil, ore and metal exports for each country and for the whole sample in quadrant II. The same procedure is repeated using gross financial flows and after which countries are categorized as either financial or non-financially integrated. Oil, ore and metal exports are used to classify a country as either resource or non-resource intensive.

Approximately 15 percent of ore and metal exports as percentage of exports is the sample average over the period and a country with ore and metal exports exceeding 15 percent is categorized a mineral exporter. A similar procedure is repeated for oil exports and gross financial flows and every country with a country average above the sample average is categorized as either oil exporter or financially integrated. The final sample is then taken by retaining countries with data available: Kenya, Ghana, Nigeria and South Africa.

3.2. Variables

Real GDP, exports, imports and inflation are taken from each reporting country. Next, FDI assets and liabilities, portfolio equity and liabilities, and foreign reserves are used to compute external financial position. The value of net financial assets in US dollar is an expression of net purchase and disposal of financial assets and liabilities. It is measuring financing by non-residents through lending and or borrowing. The sum of gross value added by all resident producers in the economy plus any product taxes less any subsidies not included in the value of the products as recorded by World Bank or IMF is taken as GDP of the reporting economy. In addition, 90-day treasury bill rates are used as proxy for short term interest rates. The underlying assumption is that they capture perceptions of policy uncertainty and market expectations of future policy interest rates. Finally, similarity in the behaviour of real and nominal exchange rates in first log difference form informs the choice of NEER for this study. The noted first log difference similarity makes the choice inconsequential. US 90-day treasury bill rates and CPI are treated as exogenous.

4. Estimation procedure

Firstly, since theory does not give a clear cut answer on the elasticity of terms of trade and external financial flows volatility to other variables in the context of frontier and emerging economies, a linear model is first estimated. The purpose of estimating this model is to identify significant variables to apply in estimation of panel VAR in the next section. Drawing on Kpodar et al. (2019) and Kpodar and Imam (2016), the OLS model is specified as:

$$Vol_{i,t} = \alpha_0 + \beta V_{i,t} + \delta IntX_{i,t} + \gamma X_{i,t} + u_{i,t} + \epsilon_{i,t} \tag{1}$$

where i and t denote country and time period respectively. Vol represents terms of trade volatility and net foreign assets volatility that are estimated and reported separately. Other volatile variables namely interest rates and exchange rate are denoted by V. Financial openness is interacted with terms of trade volatility while trade openness is interacted with foreign financial position volatility. These interaction terms , denoted by $IntX$,are included separately in the two estimations. Real GDP, gross

trade to GDP and gross external financial flows to GDP are a set of control variables denoted by X. u is country specific and ϵ is the error term.

This study deviates from the traditional way of measuring volatility using standard deviation. The use of standard deviation makes a strong assumption regarding the functional form of long-term component. Assuming that the long-term component follows an AR(1) process, this study follows Kpodar and Imam (2016) in calculating volatility as follows:

$$\ln Z_{i,t} = \alpha_i + \beta_i \ln Z_{i,t-1} + \gamma_{i,t} + \epsilon_{i,t} \tag{2}$$

Z is a variable(s) of interest for country i in time t and ϵ is the error term.

An error term that capture the cyclical component is estimated by fitting equation 2 for each country's annual data.

$$\hat{\epsilon}_{i,t} = \ln Z_{i,t} - \hat{\ln} Z_{i,t} \tag{3}$$

In a rolling 5-year period, a standard error of $\hat{\epsilon}_{i,t}$ (cyclical component) is calculated. This approach is stronger over the standard approach in that it relaxes the implicit assumption that $\alpha = \gamma = 0$ and $\beta = 1$ in equation 2. Volatility in this case is expressed as follows:

$$Volatility = \sqrt{\sum_{j=1}^{5} \frac{\hat{\epsilon}_{i,t} - \bar{\hat{\epsilon}}_{i,t}}{4}} \tag{4}$$

4.1. Panel cointegration test

Im, Pesaran and Shin (IPS) is first applied to test for panel cointegration. The unit root test used by IPS is based on the Dickey-Fuller procedure. Based on the premise by IPS, Combining time and cross-sectional series gives fewer time observation thus making the test powerful. As in the IPS procedure, specification of separate Dickey-Fuller regressions for individual cross-sections with time trend follows the form:

$$y_{it} = \rho_i y_{i,t-1} + Z_{it}^{'} \gamma_i + \varepsilon_{it} \tag{5}$$

where y is the variable being tested, ρ is an autoregressive parameter, i=1...N and t=1...T. By specifying trend, $Z_{it}^{'}$=(1,t) so that $Z_{it}^{'}\gamma_i$ represents panel-specific means and linear time trends. The error term, ε_{it} is stationary.

Assuming that all the macro panels share a common autoregressive parameter ρ is tenuous because of varying factors across countries. Concurring with Im et al. (2003), this study relaxes the assumption of a common autoregressive parameter and fits separately the equation expressed below to each panel and take the average of the resulting t statistics. The Augmented Dickey-Fuller regression:

$$\Delta y_{it} = \phi_i y_{i,t-1} + Z_{it}^{'}\gamma_i + \Sigma_{j=1}^{p}\Delta y_{i,t-j} + \varepsilon_{it} \tag{6}$$

where ϕ is panel-specific and p is the number of lags. ε_{it} is independently and normally distributed for all i and t, with heterogeneous variances σ_i^2 across panels.

4.2. Panel VAR specification

Two panel VARs are estimated, one for external financial shocks and the second one for trade channel. The empirical model applied takes the form of a first-order VAR:

$$Xy_{i,t} = \mu_i + \sum_{k=1}^{p} \Phi_k y_{i,t-k} + \epsilon_{i,t} \tag{7}$$

where μ is country-specific, and i and t denotes countries and time respectively. y comprises of $\hat{y}$ as external financial shocks and terms of trade shocks y^* as a vector of real GDP, interest rates differential and exchange rate. variables treated as exogenous are US inflation rates and 3-month treasury bill rates and denoted by X. ϵ is the error term.

4.3. FAVAR specification

the factors in Table 1 are combined into a factor-augmented vector autoregressive model (FAVAR). For each economy the factors are estimated separately as:

$$\Phi^{\mathrm{i}}_{\mathrm{j,t\text{-}1}} = \mathrm{A(L)}\Phi^{\mathrm{i}}_{\mathrm{j,t\text{-}1}} + \upsilon^{\mathrm{i}}_{\mathrm{j,t}} \tag{8}$$

where Φ is a vector of real, trade, financial and exchange rate scores at time t for the j economies.

Via an estimation of maximum likelihood, the principal components gives factors summarized in Table 1. Using the Kaiser-Guttman technique, eigenvalues equal to or greater than one are retained. Determination of the components to be retained is informed by the explanatory power of each component. A varimax rotation is then applied on the principal components making the vector of orthogonal components uncorrelated. The resulting factor scores are then used as proxies for trade balance, change in net foreign assets, and exchange rate.

Table 1: Factors (Real, Financial, Trade, and Monetary)

Real	Financial	Trade	Monetary
Real GDP	Gross financial position/GDP	Gross trade/GDP	Short term interest rates
GDP growth	Exchange rate	Exchange rate	Foreign exchange reserves
Inflation	Market capitalization	Commodity prices	Money supply
CA/GDP	Bank loans		

Note: CA represents current account

Trade balance and change in net foreign assets are separately added to the VAR model together with estimated scores for real, trade, financial and exchange rate factor as additional endogenous variables. For the three estimations, trade balance, change in net foreign assets and exchange rate are listed first since impulse responses can be sensitive to the variables ordering when Choleski decomposition is employed. The factor-augmented VAR is

$$\begin{bmatrix} \Theta^{i}_{j,t} \\ \Phi^{i}_{j,t} \end{bmatrix} = B(L) \begin{bmatrix} \Theta^{i}_{j,t-1} \\ \Phi^{i}_{j,t-1} \end{bmatrix} + \chi_{t-1} + \nu^{i}_{t-1} \tag{9}$$

where Θ is a vector for trade balance and change in net foreign assets for the j economies. χ is a vector of presumed exogenous variables, CPI and treasury bill rates as proxy for short term interest rates for US. The error term is represented by ν at time t.

Next, this study also also takes a term for terms of trade that can better capture trade composition of sample countries. Instead of taking the ratio of export and import

value indices, country-specific-intensity of exports and imports is taken into account as follows:

$$tot = \frac{\diagup P^x}{\gamma P^m} \tag{10}$$

where *tot* denotes terms of trade, $\diagup$ is the ratio of fuel, ore and metal, and agricultural products exports to total exports, P^x is the export value index, γ is the ration of fuel, ore and metal, and agricultural products imports to total imports, P^m is the import value index. Applying terms of trade only as the ratio of export and import value indices can lead to bias and discrepancies, specifically for heterogenous products Silver (2009) and the smoothing of fluctuations in energy product through subsidies and taxes noting energy products form a considerable share of value indices Chen and Rogoff (2003).

Finally, impulse responses are estimated by local projections rather than through extrapolation as proposed by Jordà (2005). This is because a model estimate, like in this case VAR, is an approximation. Furthermore, impulse responses provide empirical regularities that explain theoretical models and more robust to misspecification [6].

5. Empirical findings

In this section, we present evidence on the growing levels of financial integration as proxied by gross financial flows, evolution of trade, net foreign asset positions, and the role of valuation channel in explaining current account positions. Total flows in Fig. 4 shows the increasing level of financial integration. Following Lane and Milesi-Ferretti, $financialintegration = TFA_{it} + TFL_{it}$ where TFA(TFL)denotes total external financial assets (liabilities).

The correlation matrix of variables applied in equation 1 are reported in Table 2

Financial and trade volatility are the variables of interest testing how the two transmission mechanisms of external fair against other variables. Table 2 shows a negative and significant correlation between external financial position volatility and trade, interest rate differential , inflation and gross financial external position. A

[6] Macroeconomy variables characterized by VAR can instead follow VARMA. See: Wallis F. (1977). "Multiple Time Series and the Final Form of Econometric Models"

Table 2: Correlation matrix

	1	2	3	4	5	6	7	8	9	10
Vtot	1									
RGDP	-0.0793	1								
Vfinc	0.319**	0.170	1							
Infl	0.273**	-0.0633	-0.185	1						
Exchange	-0.0200	-0.245*	-0.460***	-0.141	1					
Interest	0.138	-0.208*	-0.110	0.548***	-0.255**	1				
i_diff	0.199*	-0.393***	-0.110	0.508***	-0.150	0.956***	1			
Trade	0.354***	-0.309**	0.109	0.193	-0.00302	0.393***	0.440***	1		
F_AL	0.169	-0.329***	0.237*	0.288**	-0.240*	0.265**	0.331***	0.424***	1	
Stk_mkt_dev	-0.262**	0.333***	0.465***	-0.379***	-0.400***	-0.361***	-0.363***	-0.231*	0.148	1

Note: Significance levelS are denoted by *, **, ***, at the 5, 10 and 1 percent respectively.
The variables presented are terms of trade volatility (Vtot), real GDP (RGDP), external financial position volatility (Vfinc), Inflation (Infl), Exchange rate (Exchange) ,Shortterm interest rates (Interest), interest rate differential (i_diff), trade openness as a log of gross trade to GDP (Trade), financial integration as a log of gross external flows to GDP (F_AL), and stock market development as capitalization to GDP (Stk_mkt_dev).

significant relationship shows that interest rate differential can affect the movement of capital as also argued by Nier et al. (2014).

Moreover, as shown in Table 2, a significant correlation between financial volatility and trade and trade volatility and gross external financial position is consistent with the findings by Riad et al. (2012) that there exists a relationship between financial and trade interconnectedness and through which countries transmit disturbances via trade or financial channel, or via both channels simultaneously. However, exchange rate has no significant relationship although policy related literature link current account movement to exchange rate, impact on the cost and size of borrowing and lending Bruno and Shin (2015), and the demand and supply of exports and imports Engel (2014). Besides, a highly significant and positive relationship between terms of trade volatility and real GDP is expected especially in low income countries with scant diversification.

The variables in Table 2 are then estimated through equation 1. Table 3 reports the regression output for terms of trade volatility on other variables.

Exchange rate volatility significantly affects trade volatility as shown in Table 3 both in resource intensive-negative impact-and non-resource intensive economies-positive impact. A rise in cross-border financial transactions due to liberalization of capital flows is likely to exacerbate exchange rate fluctuations, as also reported by Clark et al. (2004), that in term affects trade volatility. It is expected that capital flows oppose trade movement as also supported by negative coefficients for gross external financial position for the full sample. Separating the countries by resource intensity and financial integration makes the results for resource intensive and finan-

Table 3: Results for terms of trade volatility regression analysis

	Full Sample	Resource intensive	Non-resource intensive	Financially integrated	Non-financially integrated
RGDP	0.360	0.154	-0.164***	0.154	-0.164***
	(0.00000792)	(0.00001000)	(0.00000577)	(0.00001000)	(0.00000577)
Infl	0.197*	-0.021	0.620***	-0.021	0.620***
	(0.0815)	(0.0813)	(0.0917)	(0.0813)	(0.0917)
Exchange	-0.298***	-0.962***	-0.598***	-0.962***	-0.598***
	(0.000113)	(0.000215)	(0.000174)	(0.000215)	(0.000174)
Interest	-1.661*	-1.497*	0.249***	-1.497*	0.249***
	(0.00729)	(0.0134)	(0.0000650)	(0.0134)	(0.0000650)
i_diff	1.479	1.315	-0.830***	1.315	-0.830***
	(0.00741)	(0.0149)	(0.00106)	(0.0149)	(0.00106)
Trade	0.338*	0.401***	0.557***	0.401***	0.557***
	(0.0385)	(0.00342)	(0.00461)	(0.00342)	(0.00461)
F_AL*vtot	-0.072	0.083***	0.578*	0.083***	0.578*
	(0.321)	(0.0103)	(0.316)	(0.0103)	(0.316)
F_AL	0.074	-0.397**	-0.900	-0.397**	-0.900
	(0.0658)	(0.0220)	(0.117)	(0.0220)	(0.117)
Stk_mkt_dev	-0.454***	-1.098***	-0.462	-1.098***	-0.462
	(0.000141)	(0.0000759)	(0.00232)	(0.0000759)	(0.00232)
N	105	61	44	61	44

Note: The table shows standardized beta coefficients and standard erros in parentheses. Significance level for the standard errors are denoted by *, **, ***, at the 5, 10 and 1 percent respectively.

The variables presented are real GDP (RGDP), Inflation (Infl), Exchange rate (Exchange) ,Shortterm interest rates (Interest), interest rate differential (i_diff), trade openness as a log of gross trade to GDP (Trade), financial integration as a log of gross external flows to GDP (F_AL), F_AL*vtot is the interaction term for terms of trade volatility (vtot) and financial integration, and stock market development as capitalization to GDP (Stk_mkt_dev).

cially integrated economies insignificant even for the interaction term between terms of trade volatility and external financial position. However, a higher interaction term shows that capital flow movement amplifies terms of trade volatility.

The significant findings of a significant effect of terms of trade volatility due to exchange rate volatility is supported by Christensen and Upper (2017) and Burstein and Gopinath (2014) since commodity exporters, such as SSA economies, experience trade shocks more than exporters of specialized goods that are less sensitive to prices. Aggregate trade shock effect can however be incomplete if there is a disproportionate change in either exports or imports due to change in foreign exchange rate.

Next, estimation of the chosen variables on external financial position volatility is applied on equation 1 and reported in Table 4. Trade openness has high significant effect of cross-border financial flows volatility.Interacting trade openness with financial flows volatility shows that trade and financial flows volatility move in the opposite similar to the findings Kearns and Patel (2016). The net effect depends on the dominant channel. Financial flows respond significantly to exchange rate volatility only in resource intensive countries and significantly to interest rate volatility only in non-resource intensive and non-financially integrated economies.

Furthermore, for resource intensive economies, trade channel can drive exchange rates and in return fluctuations in exchange rate also impacts the cost and size of cross-border borrowing and lending. This is further supported by the reported interaction between exchange rate volatility and capital flows by Bruno and Shin (2015).

The role of monetary authorities and the impact of monetary policy on terms of trade and financial flows volatility is another important point of discussion. Domestic currency can depreciate or appreciate following a policy rate hence trade and or capital flows as also argued by Bruno and Shin (2015) that an increased cross-border borrowing is experienced when the US dollar depreciates following expansionary monetary policy in the US. The ramifications of choosing from stabilisation of exchange rate, monetary independence, capital flows and economic activity put central banks on the spotlight.

Another impact of policy stance on exchange rate and capital flows volatility is through trade effect. When monetary authorities use inflation targeting instruments

Table 4: Results for external financial position volatility analysis

	Full Sample	Resource intensive	Non-resource intensive	Financially integrated	Non-financially integrated
RGDP	0.150	0.014	-0.268**	0.014	-0.268**
	(0.00000166)	(0.00000242)	(0.0000114)	(0.00000242)	(0.0000114)
Infl	0.035	0.032	0.250	0.032	0.250
	(0.0334)	(0.0114)	(0.102)	(0.0114)	(0.102)
Exchange	-0.293**	-0.171***	-0.549*	-0.171***	-0.549*
	(0.000121)	(0.0000190)	(0.000334)	(0.0000190)	(0.000334)
Interest	-0.919*	-0.152	-1.935***	-0.152	-1.935***
	(0.00238)	(0.00233)	(0.00203)	(0.00233)	(0.00203)
i_diff	0.797*	0.120	1.425*	0.120	1.425*
	(0.00230)	(0.00303)	(0.00314)	(0.00303)	(0.00314)
Trade	0.733***	0.666***	0.467	0.666***	0.467
	(0.0207)	(0.0169)	(0.0469)	(0.0169)	(0.0469)
F_AL	0.164**	0.108**	0.173***	0.108**	0.173***
	(0.00795)	(0.00442)	(0.00749)	(0.00442)	(0.00749)
Vfinc*Trade	-1.074***	-1.048***	-0.433***	-1.048***	-0.433***
	(0.0655)	(0.0230)	(0.0861)	(0.0230)	(0.0861)
Stk_mkt_dev	-0.182*	-0.057***	-0.182	-0.057***	-0.182
	(0.0000627)	(0.00000202)	(0.00168)	(0.00000202)	(0.00168)
N	103	59	44	59	44

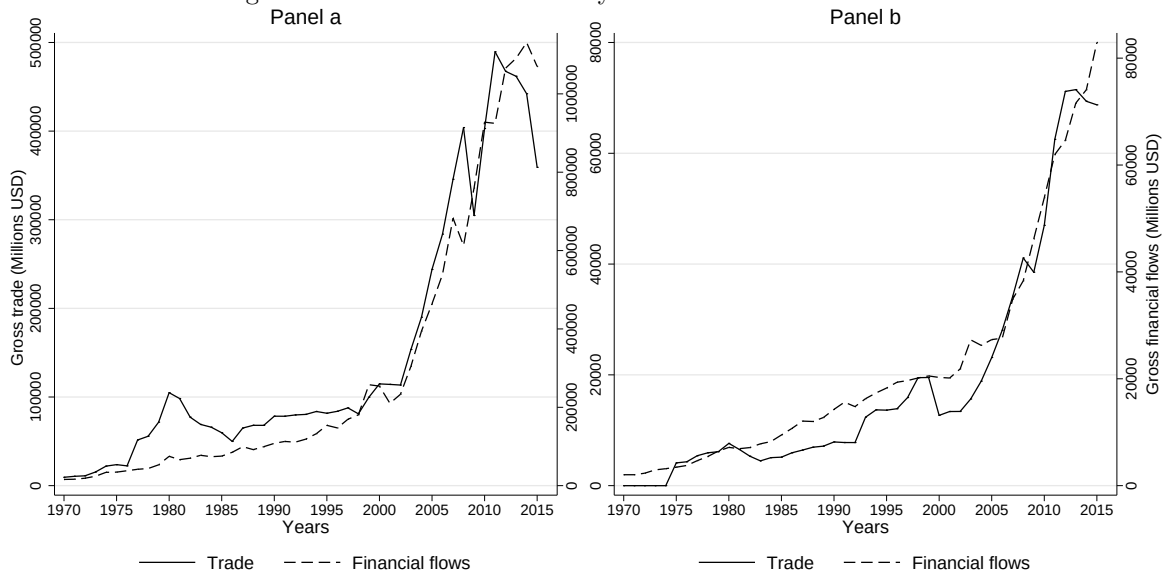
Note: The table shows standardized beta coefficients and standard erros in parentheses. Significance level for the standard errors are denoted by *, **, ***, at the 5, 10 and 1 percent respectively.

The variables presented are real GDP (RGDP), Inflation (Infl), Exchange rate (Exchange) ,Shortterm interest rates (Interest), interest rate differential (i_diff), trade openness as a log of gross trade to GDP (Trade), financial integration as a log of gross external flows to GDP (F_AL), and Trade*Vfinc is the interaction term for trade and external financial position volatility (Vfinc), and stock market development as capitalization to GDP (Stk_mkt_dev).

they face a trade off between economic activity and exchange rate stabilization. On one hand, raising interest rates lowers inflation and exchange rate props up but reduces exports and aggregate demand, while on the other hand lowering of interest rates depreciates local currency hence promoting exports while on the other hand domestic financial position may shrink due to valuation effect if a country's large share of debt is denominated in foreign currency. Similar argument to the findings of this study are advanced by Kearns and Patel (2016).

In order to establish causality between variables and variance decompositions of the significant variables identified, this study motivates the employment of VAR in the next section.

Figure 4: Gross financial flows by non-residents and trade flows



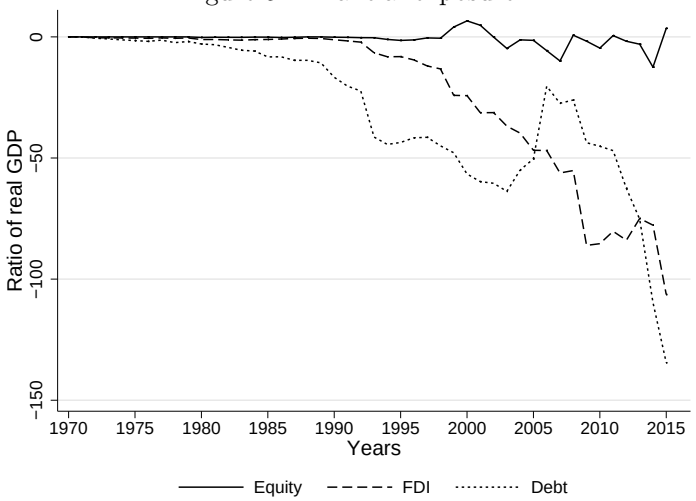
Note: The series are plotted using trade flows, and gross foreign assets and liabilities from 1970-2015. Panel a comprises resource intensive and financially integrated while Panel b comprises non-resource intensive and non-financially integrated economies.

From Figure 4, over a period 1970-2000 and 2000-2015, gross financial flows from both panels have a spectacular growth with an increase from 274,424 to 1,152,821 million USD between year 2000 and 2015. Within the same periods South Africa has an estimated 7 percent of gross financial flows in the early 70s but by the year 2000 the flows had risen by more than 14 percent. After the 2001-2002 decline, gross flows record a steady increase to a cumulative of approximately 23 percent until a sharp decline is recorded following the GFC. By 2010, growth in financial flows were at about 23 percent until a sluggish growth is seen post 2012.

In addition, trade flows from both panels were approximately 9,458 million USD in 1970 and around 127,535 million USD by 2000. A 235 percentage increase is reported by the year 2015 with a recorded trade flow of about 427915 million USD as shown in Figure 4. Trade integration over the years has been on the rise due to the growth in trade relations and openness thus increasing vulnerability to the trade shocks.

Demystifying gross financial flows by non-residents in Fig 5 captures the degree of international financial integration, whereby we report the breakdown between debt, equity and foreign direct investments. A significant shift is seen in the external balance sheet through a change in FDIs, debt and equity. In recent years, external financial position has been widely discussed with equity financing being perceived as an improvement to international risk sharing while debt is perceived as increased vulnerability Lane and Milesi-Ferretti (2007).

Figure 5: Financial exposure

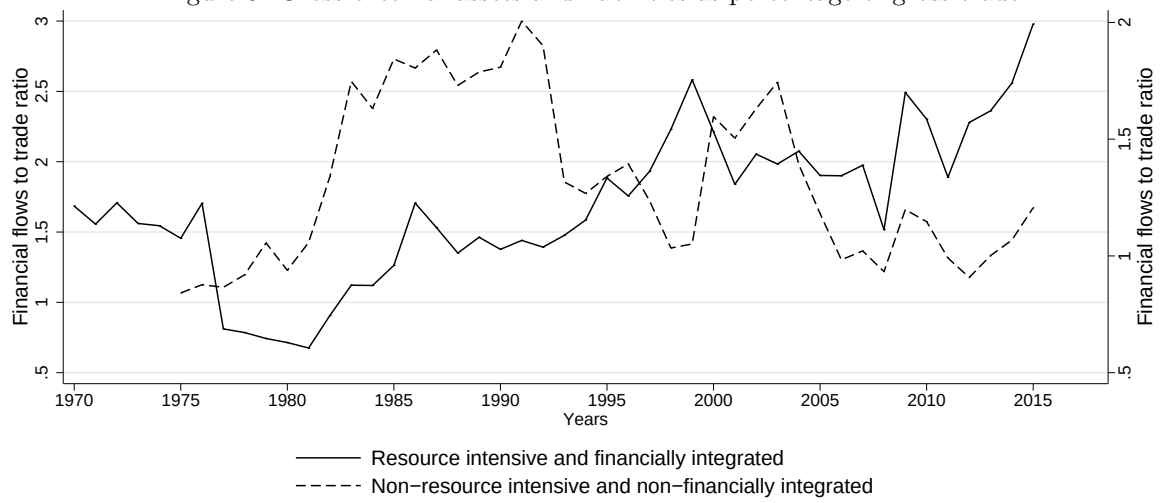


Financial flows are decomposed into debt, portfolio equity and foreign direct investments and scaled by real GDP. Note that the plots reflect nets over the sampling period.

When trade and financial integration is compared across the groups, the difference gets more starker. Gross financial flows by non-residents scaled by gross trade is shown in Fig. 6. A high ratio can be explicitly interpreted to mean growth in gross financial flows relative to trade. In other words, an increase shows that external assets and liabilities outpace expansion in gross trade. The ratio of gross external financial flows to trade is higher in financially integrated and resource intensive economies but there is a relative increase in the ratios over time.

The observed trend in the growth and composition of financial assets and liabilities

Figure 6: Gross external assets and liabilities as percentage of gross trade



The sum of assets and liabilities by foreigners is scaled by gross trade over 1970-2015

and trade further shows it is time to re-look into SSA region macro policies as exposure to external shocks continue to rise. Changes in the portfolio structure, the value of financial flows and trade also have an important role in driving the current account[7].

5.1. Stylized facts

Monetary authorities have interest rates and foreign reserves as tools estimated by the monetary factor. Monetary conditions can be tightened or relaxed through interest rates for the inflation targeting economies. The use of instruments at the disposal of monetary authorities for macro stabilization is predicted as likely to drive exchange rate, and affect trade and financial position through capital movement and valuation changes. As investor search for high yields, a rise in Treasury bills is likely to attract more short-term capital.

The use of interest differential and exchange rate is informed by the reported relationship between monetary policy and foreign exchange [8] as reported by Eichenbaum and Evans (1995) and the statistically significant effect of interest rates differential as a driver especially for private capital flows Nier et al. (2014). Interest rate differential $(i_t - i_t^*)$, as argued by Engel (2014), is an increase in the short term interest differential,

[7]Miss-measured trade flows, and errors and omissions can as well affect the correlation between net financial assets and the current although this is not included in this study.

[8]Besides the effect of interest rates on exchange rate, in economies with managed exchange rates a monetary authority can intervene in the foreign exchange market to smooth exchange rate volatility. This is not expected for a flexible regime.

ceteris paribus, is an appreciation of local currency. This study makes the assumption that agents have higher expectations on foreign returns in comparison to returns on domestic deposits.

On one hand, as the exchange rate fluctuates, shocks are predicted to be experienced for an economy with foreign currency denominated debt and or assets through the financial channel and on the other trade shocks are also expected to move in the opposite direction to financial shocks. Whether a change in exchange rate is due to a monetary policy change or trade channel, the implication is that valuation effects affect the financial position of an economy with foreign currency denominated liability Bekaert et al. (2013). Unlike countries with a floating exchange rate regime, the external competitiveness of countries with a fixed exchange rates experience large swings Kearns and Patel (2016).

Moreover, trade channel is expected to affect real activity in the domestic economy through expansionary or contractionary effects. A rise in output level following a depreciation is an expanisonary effect but for developing economies that are afflicted by currency crises depreciation is associated to a recession Frankel (2010). However, the effect on exports and imports may not be complete if there is a disproportionate change in either exports or imports due to change in foreign exchange rate.

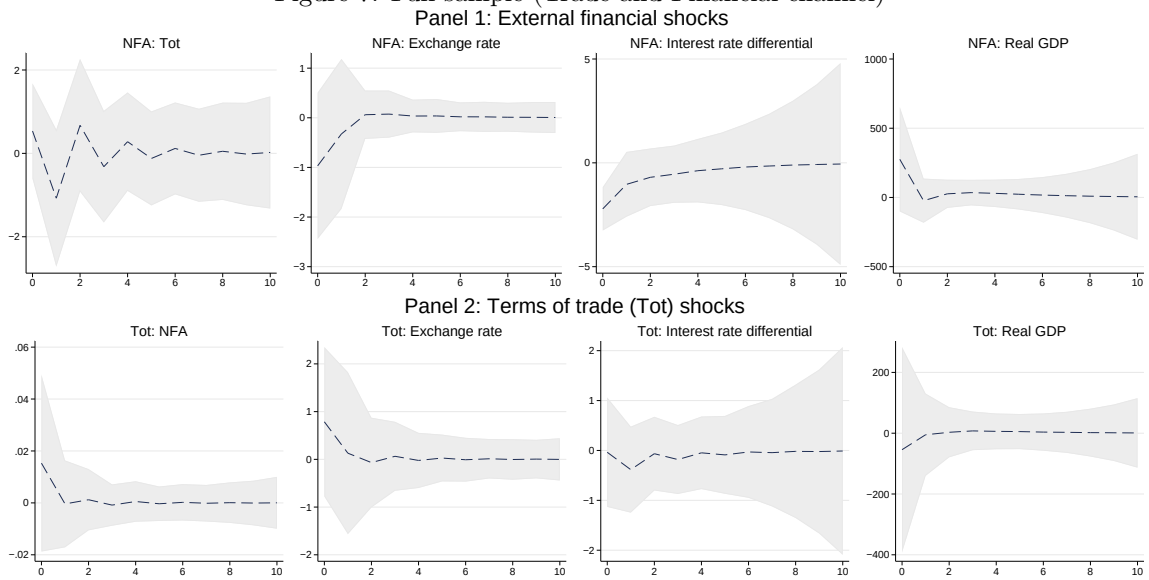
5.2. Impulse response functions

5.2.1. Panel VAR

Now we turn to the panel VAR estimation results from Equation 7. The variable of primary concern is placed first when estimating the model. Just like in the previous sections, presentation and explanation of results follows the classification of economies by resource intensity and the level of financial integration.

Figure 7 shows the impulse response functions for the full sample. Panel 1 and 2 shows the financial shocks and trade shocks respectively. A 2 percent negative shock in net external financial position is generating a positive effect on exchange rate and interest rates differential while generating a negative effect of real GDP and terms of trade. Exchange rate and net external financial position experience large negative shock due to a 5 percent negative shock in the terms of trade while real GDP has a positive but small shock.

Figure 7: Full sample (Trade and Financial channel)



Note: The figure presents orthogonalized impulse responses. Tot denotes terms of trade and NFA denotes net financial assets. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

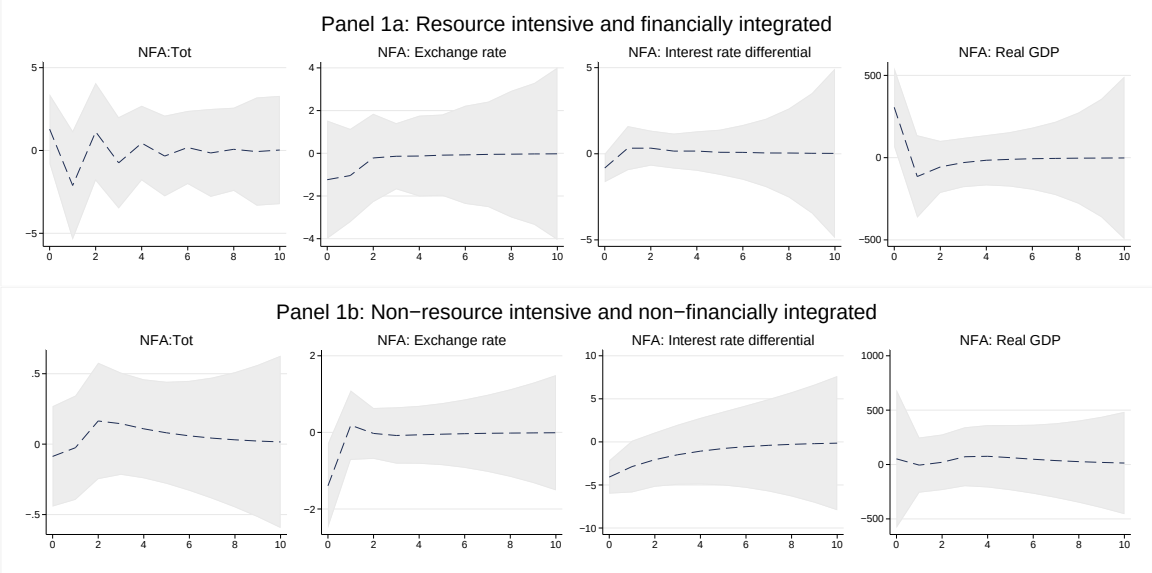
Impulse responses are then taken according the profile of sample countries in order to establish whether variation in countries resource intensity and financial integration affect the reception of external shocks. Figure 8 reports the response to the financial shocks for resource intensive and financially integrated in Panel 1a and non-resource intensive and non-financially integrated in Panel 1b.

For resource intensive and integrated countries a 2 percent negative shock in external financial position has a positive and significant effect on exchange rate. Interest rates differential has a slightly positive response but real GDP and terms of trade have a large negative response. In regard to the non-resource intensive and non-financially integrated countries, terms of trade and exchange rate receive a higher positive effect from a 1.5 percent shock in net external financial position.

Next, Figure 9 shows the trade shocks where Panel 2a reports resource intensive and financially integrated and Panel 2b is non-resource intensive and non-financially integrated economies.

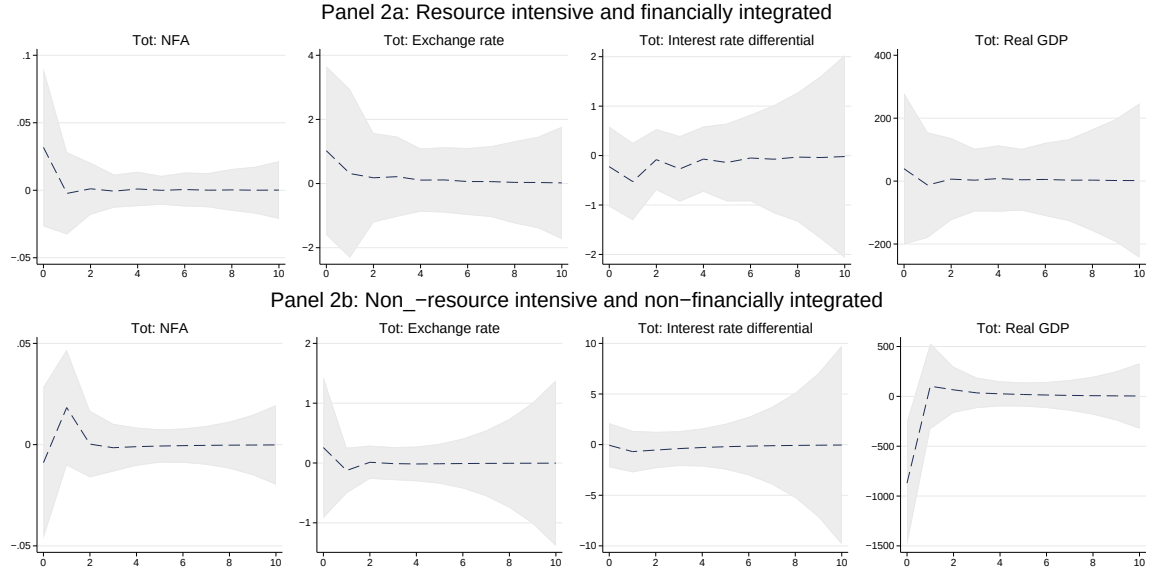
For the resource intensive and financially integrated countries, a 10 percent negative shock in terms of trade has a significant negative effect on exchange rate and a large negative effect on net external financial position. Little response is realised on real GDP. Unlike in resource intensive and financially integrated countries, real GDP

Figure 8: Financial channel



Note: The figure presents orthogonalized impulse responses. Tot denotes terms of trade and NFA denotes net financial assets. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

Figure 9: Trade channel



Note: The figure presents orthogonalized impulse responses. Tot denotes terms of trade and NFA denotes net financial assets. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

and net external financial position have a positive and large response to a 1.5 percent terms of trade negative shock.

After separating the economies using resource intensity and the degree of financial integration, it become evident that economies respond differently to external shocks and that resource intensity and financial integration are important factor for consid-

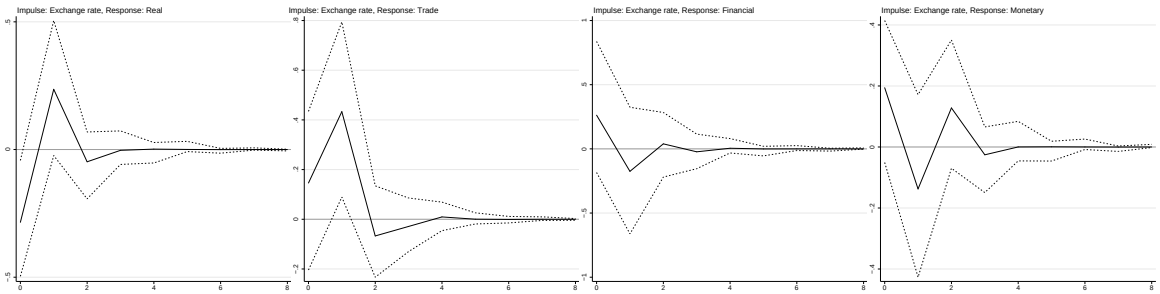
eration in analysis and policy making.

5.2.2. Panel FAVAR and country-specific analysis

This section reports FAVAR estimation results. By employing FAVAR estimations this paper differs from other studies in that it is able to account for relevant variables previously omitted in small open economy (SOE) framework. Equation 9 is applied in making estimations by employing the factor scores in Table 1. The variable of primary concern is placed first when estimating the model. Just like in the previous sections, presentation and explanation of results follows the classification of economies by non-resource intensity (for Kenya), oil exportation (for Nigeria) and resource intensive and financially integrated (for South Africa).

The estimated factors give only one principal component with eigenvalue equal to or above one for real, trade, monetary and financial factors. From a table of factor loadings, not reported in this study, the proportion explained for real, trade, monetary and financial factor are 65, 76, 70 and 64 respectively for a resource country that is financially integrated. Non-resource intensive economy has 66, 72, 71 and 66 as proportions explained for real, trade, monetary and financial factor respectively. Finally, proportions explained for oil exporting country for the real, trade, monetary and financial factor are 64, 68, 65 and 68 respectively. Next, the response of these factors to the respective shocks are discussed here.

Figure 10: Full sample: Exchange rate channel

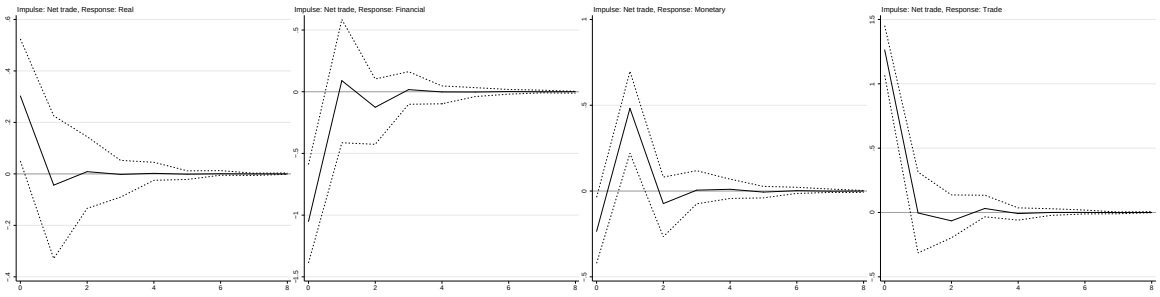


Note: Impulse responses are based on FAVAR estimations.

Depreciation in the exchange rate results into a positive response by the trade and real economic factors while financial and monetary factor contracts as shown in Fig. 10.

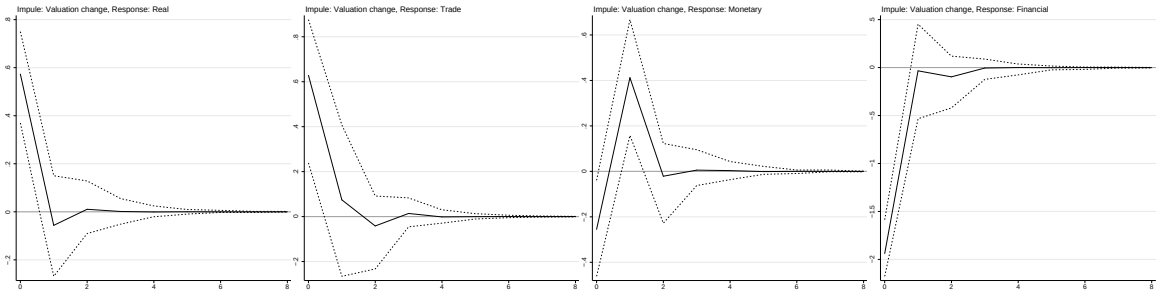
Trade and financial factors move in the opposite direction. As net international

Figure 11: Full sample: Trade channel



Note: Impulse responses are based on FAVAR estimations.

Figure 12: Full sample: Financial channel



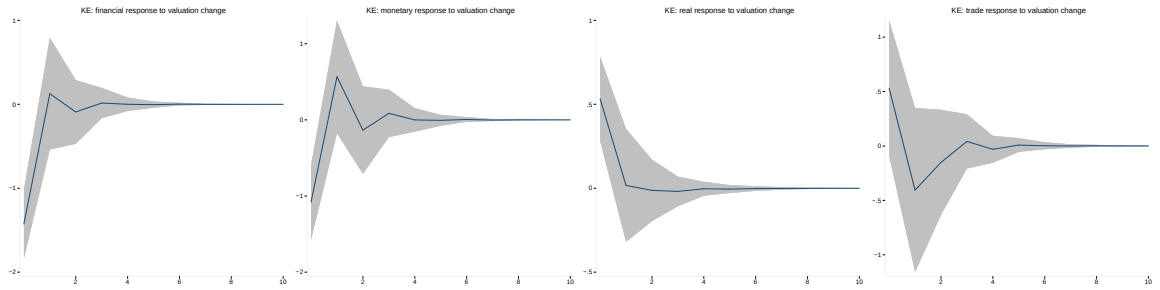
Note: Impulse responses are based on FAVAR estimations.

financial position improves, trade declines. Fig. 11 further shows that a negative shock in trade results into a decline in real factor while the monetary factor eases.

In Fig. 12, a positive shock that improves the net foreign asset position is generating a negative response on trade and financial factor while the monetary factor is loosening.

The channels are then analysed at country-level as profiled using resource intensity and financial integration.

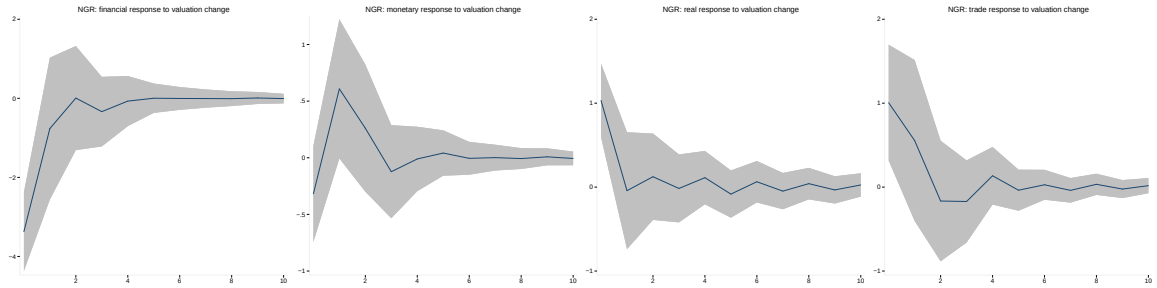
Figure 13: Non-resource intensive: Financial channel



Orthogonalized impulse responses are based on FAVAR estimations. The dotted line shows the upper and lower bounds of the 95 percent confidence interval.

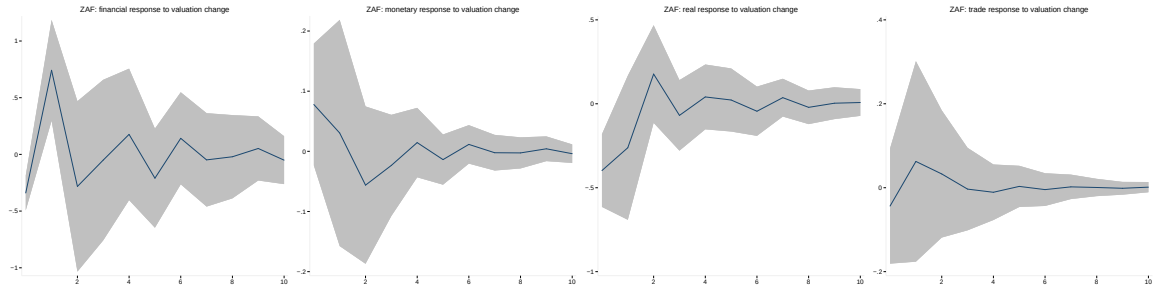
In Fig. 13, monetary condition is eased with improvement in the value of net foreign

Figure 14: Oil exporter: Financial channel



Orthogonalized impulse responses are based on FAVAR estimations. The dotted line shows the upper and lower bounds of the 95 percent confidence interval.

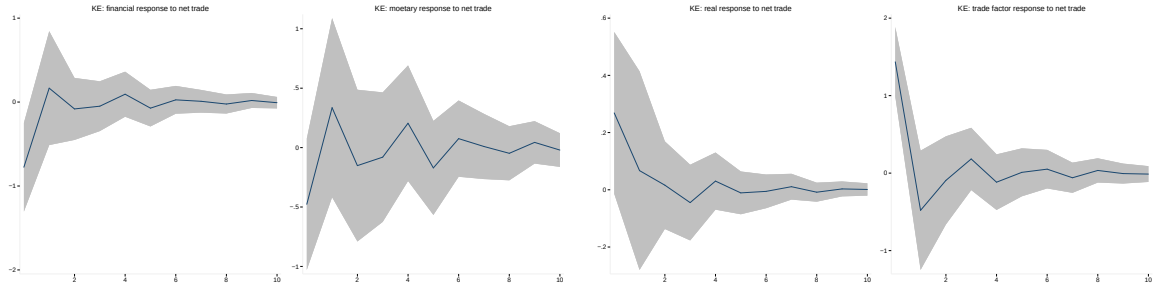
Figure 15: Resource intensive and financially integrated: Financial channel



Orthogonalized impulse responses are based on FAVAR estimations. The dotted line shows the upper and lower bounds of the 95 percent confidence interval.

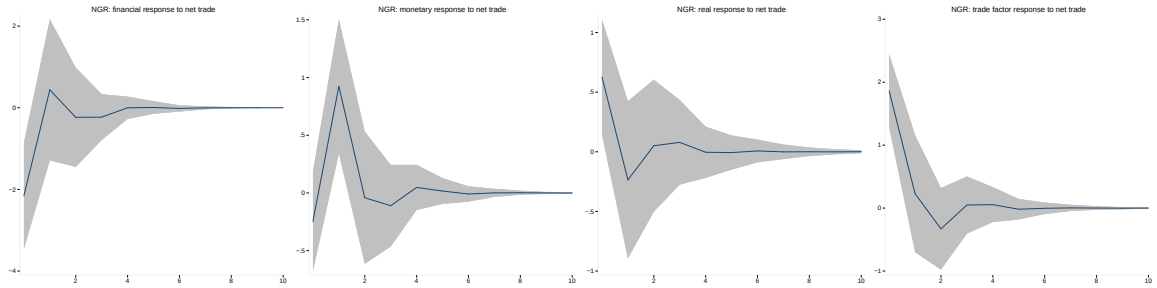
assets. Contrary, trade and real factor shows a negative response to an increase in net foreign assets. Similarly, trade and real factor is declining as net foreign assets improves but monetary condition eases in Fig. 14. It is only in Fig. 15 where trade and real activity respond positively as external financial position increases but domestic monetary condition gets tight. Another important phenomenon is that in all the horizons the magnitude of responses and decay period vary across the economies.

Figure 16: Non-resource intensive: Trade channel



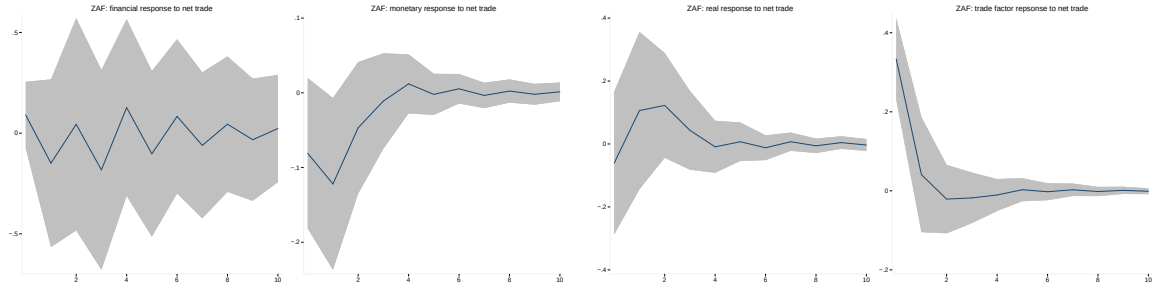
Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

Figure 17: Oil exporter: Trade channel



Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

Figure 18: Resource intensive and financially integrated: Trade channel

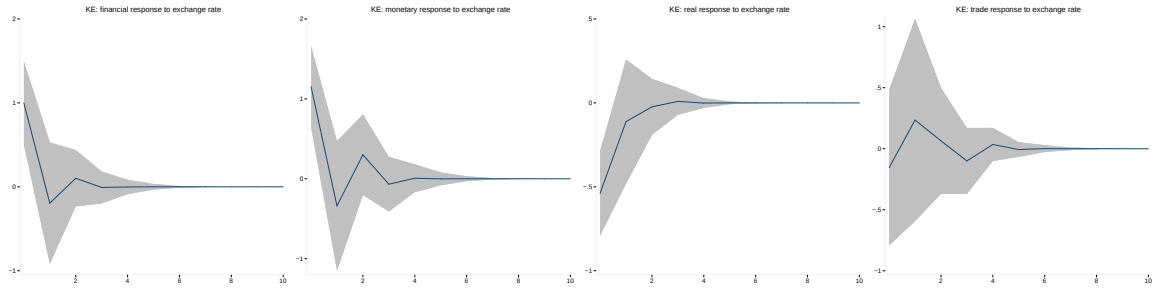


Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

When a negative trade shock is experienced, Fig. 16 shows a positive response preceding a decline in financial factor. Monetary easing takes place but real factor declines. A similar response of monetary and trade factor to trade shock is observed in Fig. 17 although the size of responses and decay periods vary. Interestingly, in Fig. 18 real factor records a growth while monetary factor contracts meaning tight monetary conditions. Financial factor is seen declining but volatility persists in all the horizons. Finally, since fluctuations in exchange rates impacts trade and change in the value of foreign assets and liabilities, the analysis is further expanded to investigate the responses of factors to exchange rate shocks. A rise in nominal effective exchange rate is defined as depreciation while a decline implies appreciation of the local currency against a given foreign currency. From economic theory, as exchange rate appreciates monetary and financial conditions are expected to loosen while the domestic real economy worsens through trade.

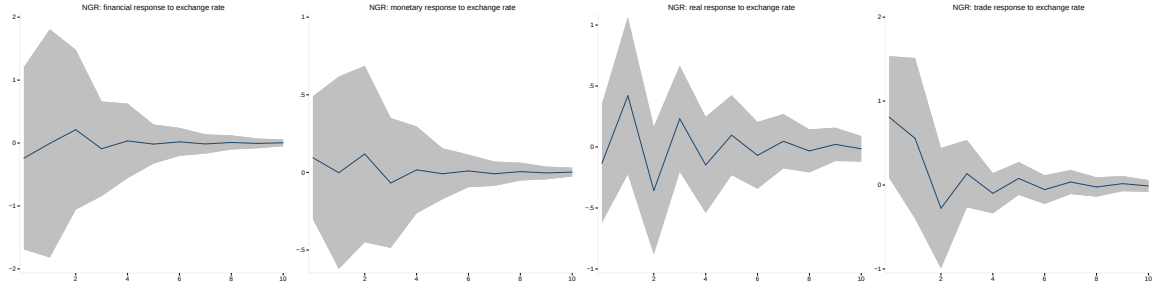
Monetary condition is tightened in Fig. 19 until after horizon 1 when monetary easing is applied. There is a likelihood that monetary authorities are intervening do-

Figure 19: Non-resource intensive: Exchange rate channel



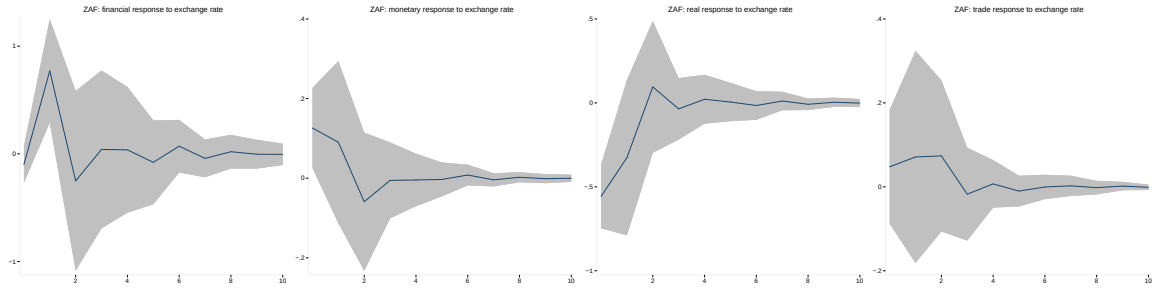
Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

Figure 20: Oil exporter: Exchange rate channel



Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

Figure 21: Resource intensive and financially integrated: Exchange rate channel



Orthogonalized impulse responses are based on FAVAR estimations. The upper and lower bounds of the 95 percent confidence interval are shown by the shaded region.

mestically through instruments such as interest rates or through foreign reserves in the exchange market. Growth in trade can be attributed to foreign exchange depreciation that makes exports relatively cheaper but as domestic currency strengthens,trade declines after period 1. Moreover, real factor increases continuously perhaps due to increased trade in horizon one and monetary easing after horizon one. However, external financial position declines due to depreciation as foreign currency liabilities increase in value.

In Fig. 20 financial and real factor responds positively to foreign exchange deprecation but real responses do not decay in all the horizons. Monetary authorities respond by tightening the monetary factor although the level of monetary intervention is lesser than in Fig. 19. Surprisingly, for the oil exporter the response trade factor to foreign exchange depreciation negative and different from that of non-resource intensive economy in magnitude, periods and direction. Unlike in the other economies discussed, for a resource intensive and financially integrated economy, Fig 21 shows that financial factor and real activity responds more to the exchange rate shocks, and there is least response for trade factor to exchange rate shocks. Like in other economies, monetary tightening is applied in response to foreign exchange depreciation.

5.3. Forecast error variance decomposition

Variance in the significance of each channel is explained by FEVDs across the economies. Analyses by full sample shows that a shock in the trade channel can explain more than 5 percent of response reported for real GDP, interest rate differential and change in the net external financial position. Financial channel as reported through the impulse of net foreign assets explains 10 percent of interest rate differential response but only 2 percent for real GDP and exchange rate movement.

When analysis is done per resource category and the level of financial integration, the percentage of variation on real GDP and terms of trade explained by financial shocks increases for resource intensive and financially integrated economies. For the category of resource intensive and financially integrated economies, financial shock can explain 10 percent of real GDP, 6 percent for the terms of trade, 5 percent for the interest rates differential and 2 percent for exchange rate fluctuations. Economies that are non-resource intensive and less financially integrated have 29 percent, 10 percent and 3 percent of variance in interest rates differential, exchange rates and terms of trade respectively explained by financial shocks.

Variation of 8 percent, 6 percent and 2 percent are explained by trade shocks in non-resource intensive and less financially integrated economies. Financially integrated and resource intensive economies have lower variances explained with only 2 percent, 1 percent and 2 percent of interest rate differential, exchange rate and net foreign assets being explained by trade shocks.

The differences makes it clear that trade and financial channels are growing in the region posing more threats to external shocks depending on the dynamics of each category of economies.

6. Conclusion

This study shows a significant rise in trade and financial integration in the selected SSA economies. Frontier and emerging economies have not been given adequate attention in international macroeconomics as they are perceived less prone to external shocks. To the contrary, this study establishes that trade and financial shocks have grown in importance as they have significant macroeconomic implications to the domestic economies. It is imperative noting that continued trade and financial integration is an indication that the effect of these economies to the global economy is as well rising.

Policy makers in frontier and EMEs just like in advanced economies are wary of implications that a policy might have to an economy's domestic and foreign position. The importance of this caution is supported by the dynamic response of each category of economies to the trade and financial shocks as established by the findings of this study. Through analysis by resource intensity and financial integration, this study has analysed financial and trade shocks for South Africa, Nigeria, Ghana and Kenya with the first two economies representing resource intensive and financially integrated economies. Monetary authority's response to trade and financial shocks through the use of policy instruments can stabilize or distabilize the economy while at the same time a positive or negative reaction can arise through the exchange rate [9], trade and capital movement as also noted by Ndung'u (2000). This is evident from the response of each category of economies to the trade and financial shocks.

Besides identifying and showing the importance of prominent shocks, varied responses of selected variables to the external shocks across the profiled economies confirms that "one size fits all" principle cannot apply. The uniqueness of each economy underscores the need for country-specific policy approach and specifically in central

[9]From early 1990 to 1997, IMF classifies Kenya as having an independent float but a managed float after 1998. South Africa has a flexible regime with Nigeria having a managed exchange rate.

banking. Managed exchange rate can work for some whereby monetary authorities intervenes in the foreign exchange market to smooth excess exchange volatility while for others targeting only the inflation and floating the exchange rate would be better as currency fluctuations are expected to clear external payment imbalances. However, for every policy measure taken other compounding effects such as capital movement, domestic real activity and change in the external financial position come to play.

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Appendix

Emerging market economies

Argentina (ARG), Bangladesh (BGD), Brazil (BRA), Bulgaria (BGR), Chile (CHL), China (CHN), Colombia (COL), Czech Republic (CZE), Hungary (HUN), India (IND), Indonesia (IDN), Korea, Rep. (KOR), Mexico (MEX), Pakistan (PAK), Peru (PER), Philippines (PHL), Poland (POL), Romania (ROU), Russian Federation (RUS), South Africa (ZAF), Taiwan, China (TWN), Thailand (THA), Turkey (TUR), Ukraine (UKR), United Arab Emirates (ARE), Venezuela, RB (VEN)

Developing economies

Armenia (ARM), Bhutan (BTN), Bolivia (BOL), Cabo Verde (CPV), Cambodia (KHM), Cameroon (CMR), Djibouti (DJI), Egypt, Arab Rep. (EGY), El Salvador (SLV), Ghana (GHA), Guatemala (GTM), Honduras (HND), Kenya (KEN), Kosovo (XKX), Kyrgyz Republic (KGZ), Lao PDR (LAO), Mauritania (MRT), Micronesia, Fed. Sts. (FSM), Mongolia (MNG), Morocco (MAR), Myanmar (MMR), Nicaragua (NIC), Nigeria (NGA), Papua New Guinea (PNG), Samoa (WSM), Solomon Islands (SLB), Sri Lanka (LKA), Sudan (SDN), Swaziland (SWZ), Syrian Arab Republic (SYR), Tajikistan (TJK), Timor-Leste (TLS), Tonga (TON), Tunisia (TUN), Uzbekistan (UZB), Vanuatu (VUT), West Bank and Gaza (PSE), Yemen, Rep. (YEM), Zambia (ZMB)

Advanced economies

Australia (AUS), Canada (CAN), Denmark (DNK), France (FRA), Israel (ISR), Italy (ITA), Japan (JPN), New Zealand (NZL), Sweden (SWE), United Kingdom (GBR), United States (USA)